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ABSTRACT

This guide outlines who may benefit from augmentative and alternative communication (AAC) approaches, such as individuals with speech handicaps, visual impairments, physical disabilities, and cognitive impairments. The guide distinguishes between "low tech" approaches such as signal systems and communication boards and "high tech" approaches which have large vocabularies, output displays, speech output, advanced input modes, rate enhancement techniques, and customizability. The importance of an ongoing, integrated process of AAC assessment and intervention is discussed, and crucial intervention issues are noted, including training on interaction strategies, promoting language and literacy skills, and selecting vocabulary. A list of organizational resources, journals/newsletters, products, and 13 suggested readings is appended. (JDD)

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Center for Special Education Technology

Tech Use Guide

Using Computer Technology

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Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, non-electronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with congitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-It-All II Plus*, *scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message

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selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display—the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multi-meaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo*, *Votrax*, and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker*, *ALLTALK*, and *Parrot*.

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations; almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communication systems. *Voicescribe-1000*, a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer*, learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviations. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologists, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston & Dowden, 1985 and Blackstone, Cassatt-James & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has

matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early successes to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight word vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondences orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories - This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries - AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review - Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?

- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, **the consumer should be involved in the process to the greatest extent possible**.

Resources - Organizations

American Speech-Language-Hearing Association, 10801 Rockville Pike, Rockville, MD 20852, 301/897-5700.

Applied Science and Engineering Laboratories, University of Delaware/A. I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899, 302/651-6830.

RESNA, 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036, 202/857-1199.

Trace Research and Development Center, S-151 Waisman Center, University of Wisconsin-Madison, 1500 Highland Avenue, Madison, WI 53705, 608/262-6966.

United States Society for Augmentative and Alternative Communication, Judy Montgomery, President, Fountain Valley School District, 17210 Oak Street, Fountain Valley, CA 92708, 714/857-1478.

Resources - Journals/Newsletters

Augmentative and Alternative Communication [journal], Williams & Wilkins, Publisher, 428 E. Preston Street, Baltimore, MD 21202-3933.

Augmentative Communication News [newsletter], Sunset Enterprises, One Surf Way, Suite 215, Monterey, CA 93940, 408/649-3050.

Communication Outlook [newsletter], Artificial Language Laboratory, Michigan State University, 405 Computer Center, East Lansing, MI 48824-1042, 517/353-0870.

Closing the Gap [newspaper], Rt. 2, Box 39, Henderson, MN 56044, 612/248-3294.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control, & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA [product database]. Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice, Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader, Crestwood Company, P.O. Box 04606, Milwaukee, WI 53204, 414/461-9876.

Voicescribe-1000, Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus, Innocomp, 33195 Wagon Wheel, Solon, OH 44139, 216/248-6206.

VOIS 160, Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch, Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen, Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA, Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

Readings

Beukelman, D. R. & Yorkston, K. M. (1989) Augmentative and alternative communication application for persons with severe acquired communication disorders: An introduction. *Augmentative and Alternative Communication, 5,* 3-13.

Beukelman, D. R., Yorkston, K. M., & Dowden, P. A. (1985). *Communication augmentation: A casebook of clinical management.* San Diego: College-Hill Press.

Blackstone, S. W. (Ed.). (1986). Augmentative communicaton: An introduction. Rockville, MD: American Speech-Language-Hearing Association.

Blackstone, S. W., Cassatt-James, E. L., & Bruskin, D. M. (Eds.). (1988). *Augmentative communication: Implementation strategies.* Rockville, MD: American Speech-Language-Hearing Association.

Blau, A. F. (1986). Vocabulary selection in augmentative communication: Where do we begin? In H. Winitz (Ed.), *Treating language disorders: For clinicians by clinicians* (pp. 205-234). Baltimore: University Park Press.

Blau, A. F. (1988). Fostering literacy development. In S.W. Blackstone, E. L. Cassatt-James, & D. M. Bruskin (Eds.), *Augmentative communication: Implementation strategies* (pp. 5.6/1- 9). Rockville, MD: American Speech-Language-Hearing Association.

Brandenburg, S., & Vanderheiden, G. C. (1988). Communication board design and vocabulary selection. *The vocally impaired: Clinical practice and research* (pp. 84-133). New York: Grune and Stratton.

Cohen, C. G. (1988). Developing writing skills in the classroom through the use of word processing. In S. W. Blackstone, E. L. Cassatt-James, & D. M. Bruskin (Eds.), *Augmentative communication: Implementation strategies* (pp. 5.6/18-21). Rockville, MD: American Speech-Language-Hearing Association.

Kraat, A. W. (1987). *Communication interaction between aid users and natural speakers: An IPCAS study report.* Madison, WI: Trace Research and Development Center.

Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication, 5,* 137-144.

Mirenda, P., & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication, 3,* 120-128.

Mirenda, P., & Mathy-Laikko, P. (1989). Augmentative and alternative communication applications for persons with severe congenital communication disorders: An introduction. *Augmentative and Alternative Communication, 5,* 3-13.

Yorkston, K. M., Honsinger, M. J., Dowden, P. A., & Marriner, N. (1989). Vocabulary selection: A case report. *Augmentative and Alternative Communication, 5,* 101-108.

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